

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-164293

(43)Date of publication of application : 18.06.1999

(51)Int.Cl.

H04N 7/18
G02B 21/36

(21)Application number : 09-342213

(71)Applicant : KEYENCE CORP

(22)Date of filing : 26.11.1997

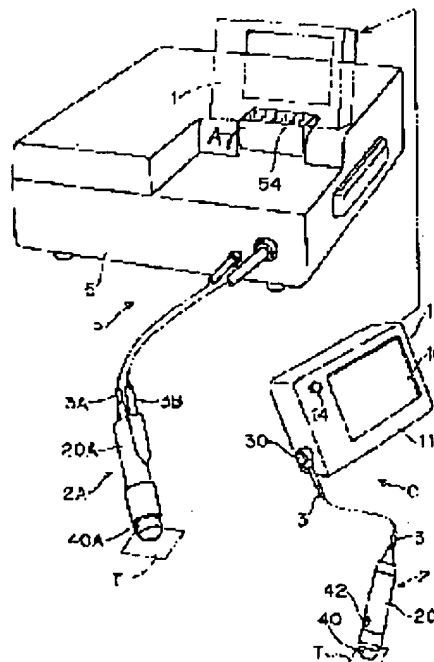
(72)Inventor : INOMATA MASAHIRO

(54) MAGNIFICATION OBSERVATION UNIT AND MAGNIFICATION IMAGE PICKUP DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a device that is applicable to various applications and has enhanced availability.

SOLUTION: This magnification observation unit is configured with a combination of a slave set C consisting of a 1st image pickup section 2 that photographs a magnified image and of a magnification observation device having a video image means that displays a video image based on photographed information from the 1st image pickup section 2; and of a master set P consisting of a 2nd image pickup device section 2A that photographs a magnified image and of a magnification image pickup device having an image processing means that applies image processing to photographed information from the 2nd image pickup device section 2A. In the above configuration, the video information based on the photographed information by the 2nd image pickup device section 2A of the master set P is displayed on the video means of the slave set C via a communication means.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's

decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] the image information based on the image pick-up information which is characterized by providing the following and which constituted the expansion observation unit combining the main phone which consists of expansion image pick-up equipment, and was picturized in the 2nd image pick-up section of the aforementioned main phone -- means of communications -- minding -- the above -- the expansion observation unit it enabled it to be able to begin to project on the image means of a cordless handset The cordless handset which consists of expansion observation equipment equipped with the image means which projects the image based on the image pick-up information from the 1st image pick-up section which picturizes an expansion picture, and this 1st image pick-up section. An image-processing means to perform an image processing to image pick-up information from the 2nd image pick-up section which picturizes an expansion picture, and this 2nd image pick-up section.

[Claim 2] the image information which carried out the image processing by the image-processing means of the aforementioned main phone in the claim 1 -- the aforementioned means of communications -- minding -- the above -- the expansion observation unit it enabled it to be able to begin to project on the image means of a cordless handset

[Claim 3] the main phone which consists of expansion image pick-up equipment characterized by providing the following -- combining -- an expansion observation unit -- constituting -- the above -- the expansion observation unit which could be made to carry out the image processing of the image pick-up information picturized in the 1st image pick-up section of a cordless handset by the image-processing means of the aforementioned main phone The cordless handset which consists of expansion observation equipment equipped with the image means which projects the image based

on the image pick-up information from the 1st image pick-up section which picturizes an expansion picture, and this 1st image pick-up section. An image-processing means to perform an image processing to image pick-up information from the 2nd image pick-up section which picturizes an expansion picture, and this 2nd image pick-up section.

[Claim 4] the image information which carried out the image processing by the image-processing means of the aforementioned main phone in the claim 3 -- means of communications -- minding -- the above -- the expansion observation unit it enabled it to be able to begin to project on the image means of a cordless handset

[Claim 5] without it minds [which built in the image-processing means of the aforementioned main phone / main phone book] a cable in claims 1, 2, and 3 or 4 -- the above -- the expansion observation unit which enabled it to connect the image means of a cordless handset by the connector

[Claim 6] a claim 1 or any 1 term of 5 -- setting -- the above -- a cordless handset This soma is connected by the 1st cable. the aforementioned 1st image pick-up section equipped with the 1st tube-like object which holds the 1st image pick-up element and the 1st lens unit for image formation, and the cordless handset equipped with the aforementioned image means -- the aforementioned main phone The expansion observation unit to which the aforementioned 2nd image pick-up section equipped with the 2nd tube-like object which holds the 2nd image pick-up element and the 2nd lens unit for image formation, and the main phone book soma which built in the aforementioned image-processing means are connected by the 2nd cable.

[Claim 7] a claim 1 or any 1 term of 6 -- setting -- the above -- the expansion observation unit which has the connector for media equipped with a record medium with same cordless handset and main phone

[Claim 8] It is the expansion observation unit which the aforementioned main phone equips with the measurement function in the claim 1 or any 1 term of 7.

[Claim 9] Expansion image pick-up equipment which was expansion image pick-up equipment characterized by providing the following, and prepared the input port which inputs other image pick-up information and image information from equipment in this aforementioned soma while preparing the output port which outputs the signal based on the aforementioned image pick-up information in this aforementioned soma. The image pick-up section which picturizes the expansion picture of the aforementioned object while a lighting system is attached in the point of the tube-like object which holds an image pick-up element and the lens unit for image formation and irradiating lighting light from this lighting system at an object. This soma which built in the light source which supplies light to an image-processing means to perform an image processing to image pick-up information from this image pick-up section, and a row, through a light guide means at the aforementioned lighting system.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to expansion observation equipment like the so-called microscope.

[0002]

[Description of the Prior Art] Conventionally, expansion observation equipment 100 as shown in drawing 10 is known. In drawing 10, the expansion picture picturized in the image pck-up section 101 is projected on the exclusive monitor 103 through the digital disposal circuit built in this soma 102. Since the image pck-up section 101 is connected with this soma 102 by the cable 104, unlike the so-called microscope, this expansion observation equipment 100 has the advantage of it not being necessary to cut down Object T etc.

[0003]

[Problem(s) to be Solved by the Invention] By the way, although there is also a thing forms a handle 105 and it enabled it to carry in the aforementioned expansion observation equipment 100, expansion observation equipment 100 is enlarged on a relation equipped with various functions, such as a complicated image-processing function and a measurement function, therefore it is hard to carry.

[0004] On the other hand, the output port which outputs an analog and a digital video signal is prepared in the aforementioned expansion observation equipment 100, and an expansion picture can be projected on the monitor of television or a personal computer through this output port. Here, the utility value of the exclusive monitor 103 carried in expansion observation equipment 100 uses other monitors in many cases low therefore from the reasons of being hard to see it, since the exclusive monitor 103 of expansion observation equipment 100 is small. On the other hand, only in the part, cost becomes high by having the exclusive monitor 103.

[0005] this invention was made in view of the aforementioned conventional problem, and the purpose is raising utility value, as the equipment which acquires this expansion picture can be used for various uses.

[0006] In order to attain the aforementioned purpose, this expansion observation unit is first constituted by the expansion observation equipment and expansion image pck-up equipment which are explained below. Expansion observation equipment constitutes the cordless handset of this unit, and is equipped with the image means which projects the image based on the image pck-up information from the 1st image pck-up section which picturizes an expansion picture, and this 1st image pck-up section. On the other

hand, expansion image pck-up equipment constitutes the main phone of the aforementioned unit, and equips image pck-up information with an image-processing means to perform an image processing, from the 2nd image pck-up section which picturizes an expansion picture, and this 2nd image pck-up section.

[0007] the image based on the image pck-up information which picturized the expansion observation unit of **** 1 invention (claim 1) in the 2nd image pck-up section of the aforementioned main phone -- means of communications -- minding -- the above -- it enables it to be able to begin to project on the image means of a cordless handset Since it can begin to project the image pck-up information which performed the image processing with the main phone on the image means of a cordless handset according to **** 1 invention, an expansion picture can be seen even if there is no monitor in a main phone.

[0008] the expansion observation unit of **** 2 invention (claim 3) -- the above -- it can be made to carry out by the image-processing means of the aforementioned main phone the image processing of the image pck-up information picturized in the 1st image pck-up section of a cordless handset

[0009] Since according to **** 2 invention an image processing etc. can be performed for the image pck-up information acquired with the cordless handset with a main phone and the function to perform a complicated image processing to a cordless handset is unnecessary, a cordless handset can be miniaturized. Therefore, since it becomes easy to carry a cordless handset, utility value, such as being easy to carry in a site, increases.

[0010] moreover, this invention -- setting -- "the image information based on image pck-up information" -- "image pck-up information -- the information which amended the chip of a pixel etc. other than information as it is, and the information which performed the image processing to the aforementioned image pck-up information are said

[0011] Moreover, in this invention, "means of communications" is a component for generally, clarifying that the main phone and cordless handset of this invention can be used in a separate place, although it consists of a cable or a connector. In addition, as "means of communications", you may adopt the means of communications of radio etc.

[0012] As expansion image pck-up equipment of **** 3 invention which constitutes the main phone of **** 1 and the 2nd invention The image pck-up section which picturizes the expansion picture of an object while a lighting system is attached in the point of the tube-like object which holds an image pck-up element and the lens unit for image formation and irradiating lighting light from this lighting system at an object, In the image-processing means and row which perform an image processing to image pck-up information from this image pck-up section While being expansion image pck-up equipment equipped with this soma which built in the light source which supplies light to a lighting system through a light guide means and preparing the output port which outputs the signal based on image pck-up information in this soma The expansion

image pick-up equipment which prepared the input port which inputs other image pick-up information and image information from equipment in this soma is employable.

[0013] Since the expansion image pick-up equipment of **** 3 invention does not have the image means, it cannot observe an expansion picture in its simple substance. However, since it has the output port which outputs the signal based on image pick-up information, an expansion picture is observable by connecting this expansion image pick-up equipment and the various equipments equipped with the image means. Moreover, since it has input port which inputs other image pick-up information and image information from equipment, the image processing of the image pick-up information from the cordless handset of the 1st and 2nd invention can be carried out, for example, and image information can be outputted from the aforementioned output port.

[0014]

[Embodiments of the Invention] Hereafter, 1 operation gestalt of this invention is explained according to a drawing. drawing 1 -- setting -- a main phone (expansion image pick-up equipment) P and a cordless handset (expansion observation equipment) -- an expansion observation unit consists of C

[0015] First, a cordless handset C is explained. it is shown in drawing 1 -- as -- a cordless handset -- the cordless handset with which C has a liquid crystal display monitor (image means) 10 -- it has this soma 1 and the 1st image pick-up section 2 the above -- a cordless handset -- this soma 1 and the 1st image pick-up section 2 are mutually connected to the 1st image pick-up section 2 by the 1st cable 3 connected with one this 1st cable 3 -- the 1st connector 30 -- a cordless handset -- it connects free [removal] to this soma 1 the aforementioned liquid crystal display monitor 10 -- a cordless handset -- the cordless handset of the abbreviation rectangular parallelepiped configuration in this soma 1 -- it is prepared in the outside surface of the main part case 11

[0016] As for the aforementioned 1st image pick-up section 2, the case is constituted by the 1st tube-like object 20 in drawing 2 . In this 1st tube-like object 20, CCD (the 1st image pick-up element)24, the CCD drive circuit 25, and the 1st lens unit 26 for image formation are held. This 1st lens unit 26 consists of two or more lenses for image formation, is performing the so-called focus adjustment, and carries out image formation of the image of Object T on CCD24.

[0017] The 1st lighting head 40 is being fixed at the nose of cam of the 1st tube-like object 20 of the above. This lighting head 40 consists of light guide meanses by which are for irradiating the light from many Light Emitting Diodes (light emitting diode : an example of the light source)41 at Object T, for example, the vacuum evaporation of the metal thin film was carried out to the outside surface of transparent acrylic resin. The above Light Emitting Diode 41 is established over the perimeter on the periphery of

drawing 2 (b) for example, in the equiangular pitch.

[0018] it is shown in drawing 3 -- as -- the above Light Emitting Diode 41 -- the lighting switch 42 and main-power-supply switch 12a -- minding -- a cordless handset -- it connects with the rechargeable battery 12 and power circuit (not shown) which were built in this soma 1, the light is switched on in the state where aforementioned main-power-supply switch 12a and the lighting switch 42 are closing, and light is irradiated with a continuous lighting light at the object T of drawing 2. It is condensed in the 1st lens unit 26, image formation of the light reflected with Object T is carried out on CCD24, and after photo electric translation is carried out, it is read by the CCD drive circuit 25 as an image pck-up signal (image pck-up information), and is inputted into the 1st digital disposal circuit 13 of drawing 3. The 1st digital disposal circuit 13 makes the expansion picture of the object based on the image pck-up signal made to memorize project on a liquid crystal display monitor 10 while making 1st image-memory 13a memorize an image pck-up signal one by one. the above -- a cordless handset -- shutter ** 14 is formed in this soma 1, and the 1st digital disposal circuit 13 stores in a record medium 15 the picture projected on the liquid crystal display monitor 10 (1st image-memory 13a was made to memorize) by carrying out the depression of this shutter ** 14

[0019] in addition, the record medium 15 -- for example, the inside of a card-like case -- RAM -- holding -- becoming -- a cordless handset -- it is inserted from the insertion mouth (not shown) formed in this soma 1, and connects with the 1st digital disposal circuit 13 through connector 13b for media. moreover, a cordless handset -- the 2nd connector 17 with which the input port into which the image information (video signal) from a main phone P is inputted, and the output port which outputs image information etc. to a main phone P were united is formed in this soma 1

[0020] the next -- a cordless handset -- the example of use of C simple substance is explained. First, if main-power-supply switch 12a is turned ON, the lighting head 40 is brought close to the object T of drawing 1 and the lighting switch 42 is turned ON, the expansion picture of Object T will project on a liquid crystal display monitor 10. An expansion picture will be memorized by the record medium 15 of drawing 3 if the depression of shutter ** 14 is carried out after discovering the required portion of an image pck-up, looking at this expansion picture. thus, a book -- a cordless handset -- C can project an expansion picture on a liquid crystal display monitor 10 while being able to picturize an expansion picture

[0021] Below, a main phone P is explained. As shown in drawing 1, the image means is not prepared in a main phone P. It comes to connect this main phone P of each other [2nd image pck-up section 2A and the main phone book soma 5 / in 2nd cable 3A and fiber optic cable 3B].

[0022] As shown in drawing 4, the aforementioned 2nd image pck-up section 2A

CCD(the image-pck-up [2nd] element)24A Reaches, and 2nd lens unit 26A is held in 2nd tube-like object 20A. 2nd lighting head (lighting system) 40A is attached at the nose of cam of this 2nd image pck-up section 2A. Lighting light is supplied to this 2nd lighting head 40A through the optical fiber (light guide means) 31 and the aforementioned fiber optic cable 3B which were inserted in in 2nd tube-like object 20A from the halogen lamp (light source) 32 built in the main phone book soma 5. CCD drive circuit 25A is held in the main phone book soma 5, and this CCD drive circuit 25A reads the charge of CCD24A to it through 2nd cable 3A and the 3rd connector 33. In addition, CCD24of 2nd image pck-up section 2A A has more pixels than CCD24 of the 1st image pck-up section 2 of drawing 2 , and the lamp 32 of drawing 4 has the quantity of light larger than Light Emitting Diode41 of drawing 2 .

[0023] While the 2nd digital disposal circuit 50 and the mode setting section 51 are built in, the 4th, the 5th, the 6th, and 7th connectors 54-57 connected to the 2nd digital disposal circuit 50 are formed in the main phone book soma 5. the 2nd digital disposal circuit 50 of the above -- the [the image-processing means 58, the measurement means 59, and] -- it has 2 image-memory 50a The aforementioned image-processing means 58 performs an image processing to the image pck-up information memorized by 2nd image-memory 50a according to the setup of the mode setting section 51. In addition, the port (connector) outputted and inputted with the informational content of processing according to a setup of the mode setting section 51 is chosen. Moreover, two digital disposal circuits 50 and 13 perform communications control with mutual or a personal computer.

[0024] The aforementioned measurement means 59 is the function which computes a geometric value, and computes the area of the predetermined field surrounded by the distance for two points clicked on the liquid crystal display monitor 10 (specification), the angle defined by three points, and the segment etc. the [in addition, / 2nd lens unit 26A into which these geometric values were inputted, or] -- it is computed from the scale factor and the number of pixels of 1 lens unit 26

[0025] the 4th connector 54 of the above consists of input/output port equipped with the output port which outputs the video signal based on the image pck-up information memorized by 2nd image-memory 50a, and the input port which inputs the image pck-up information from a cordless handset C, and is shown in drawing 5 -- as -- a cordless handset -- it has come to be able to carry out a direct file to the 2nd connector 17 of this soma 1 namely, the image pck-up information picturized by 2nd image pck-up section 2A of a main phone P -- as it is -- or -- as the image information which carried out the image processing by the image-processing means 58 -- the 2nd digital disposal circuit 50 -- the 4th connector 54 and 17 -- minding -- a cordless handset -- it can transmit to the 1st digital disposal circuit 13 of C, and can begin to project now on a liquid crystal display monitor 10 moreover, it is shown in drawing 6 -- as -- a cordless

handset -- after the 1st digital disposal circuit 13 transmits the image pick-up information picturized in the 1st image pick-up section 2 of C to the 2nd digital disposal circuit 50 of a main phone P through the 2nd connector 17 and 54 -- further -- the image-processing means 58 -- an image processing -- carrying out -- again -- the 1st digital disposal circuit 13 from the 2nd digital disposal circuit 50 -- the image information concerned which carried out the image processing -- a cordless handset -- it can begin to project now on the liquid crystal display monitor 10 of C Therefore, an image can be seen even if there is no monitor in a main phone P.

[0026] Moreover, the 2nd digital disposal circuit 50 of aforementioned drawing 4 changes digital image pick-up information into the color-television signal (signal which superimposed the luminance signal and the chrominance signal) of an analog, and outputs this television signal from the 5th connector 55. That is, the expansion picture picturized by 2nd image pick-up section 2A can be seen by connecting the television 60 of the analog formula of drawing 7 to the 5th connector 55. Moreover, the 6th connector 56 of the above is serial input/output port like RS232C, and the video signal memorized by 2nd image-memory 50a can output it now to a personal computer 61 from the 6th connector 56 by connecting a personal computer 61 to the 6th connector 56.

[0027] As shown in drawing 8, the 7th connector 57 of the above is for incorporating the image pick-up information from other image pick-up equipments 70. After the image pick-up information incorporated from other image pick-up equipments 70 is inputted into the 2nd digital disposal circuit 50, a predetermined image processing is performed and it can be projected on television 60 grade. In addition, as other image pick-up equipments, there is a video scope which records an endoscope and an animation, for example.

[0028] The main phone book soma 5 of drawing 4 has connector 50b for media for connecting a record medium 15, and can incorporate now the image pick-up information memorized by the record medium 15 to the 2nd digital disposal circuit 50. That is, the image pick-up information which was picturized with the cordless handset C of drawing 3, and was memorized by the record medium 15 is constituted so that an image processing can be carried out by the image-processing means 58 of drawing 4.

[0029] Below, the example of use of this expansion observation unit is explained. drawing 9 (a) -- like -- a cordless handset -- this soma 1 -- a record medium 15 -- loading -- a cordless handset -- the expansion picture picturized by C is stored in a record medium 15 (record) Next, like drawing 9 (b), while loading the main phone book soma 5 with the aforementioned record medium 15 Connect this soma 1 and the image pick-up information recorded on the record medium 15 is read by the 2nd digital disposal circuit 50. the main phone book soma 5 -- a cordless handset -- this -- the 4th connector 54 and the 2nd connector 17 -- minding -- a cordless handset -- the 1st digital disposal circuit 13 of this soma 1 -- transmitting -- a cordless handset -- an expansion picture is made to

project on the liquid crystal display monitor 10 of this soma 1 furthermore, the image information which was made to perform a desired image processing with the image-processing means 58, and carried out the image processing while looking at the picture concerned -- real time -- a cordless handset -- the image which carried out the image processing can be seen by the liquid crystal display monitor 10 by transmitting to this soma 1

[0030] here -- a cordless handset -- since C does not have the image-processing means and it can miniaturize like drawing 1 -- this -- a cordless handset -- he can walk easily with C to an investigation site or an accident site (portability is good) Therefore, utility value increases compared with the big expansion observation equipment 100 of drawing 10 .

[0031] moreover, two or more sets of one set of the main phone P of drawing 1 , and cordless handsets -- reserving C -- two or more persons -- respectively -- a cordless handset -- it can be used, being able to carry out C here -- a cordless handset -- C is complicated -- it is -- carrying out -- since it does not have an advanced image-processing function or an advanced measurement function and is cheap, a difference does not become [cost] high even if two or more persons enable it to use it simultaneously That is, it becomes cheap at super-** rather than it purchases two or more conventional expansion observation equipments 100.

[0032] in addition, drawing 9 (c) -- like -- the main phone book soma 5 -- television 60 and a personal computer 61 -- connecting -- a cordless handset -- you may observe the picture picturized by C with a big monitor Moreover, a printer may be connected to the 6th connector 56 and an expansion picture may be printed out.

[0033] in addition, the arrow A of drawing 1 shows -- as -- a cordless handset -- if the 4th connector 54 which connects this soma 1 is formed free [****] -- a cordless handset -- this soma 1 becomes legible

[0034]

[Effect of the Invention] Since it can begin to project the image pick-up information picturized with the main phone on the image means of a cordless handset according to invention of a claim 1 as explained above, an expansion picture can be seen even if there is no monitor in a main phone. Moreover, by using as another object the cordless handset which is not equipped with a complicated image-processing function and a complicated measurement function, the portability of a cordless handset increases and utility value increases.

[0035] Moreover, since according to invention of a claim 3 an image processing etc. can be performed to the image pick-up information acquired with the cordless handset with a main phone and it is not necessary to equip a cordless handset with a complicated image-processing function, the portability of a cordless handset increases and utility value increases.

[0036] Thus, since this invention divided the function into the main phone and the cordless handset, with conventional expansion observation equipment -- he can walk with the cordless handset excellent in portability by having two or more sets of one set of a main phone, and cordless handsets -- two or more sets, it is cheap and utility value becomes [rather than] high.